

DETAILED ACTION

Telephone Election and Status

1. Claims 1-25, filed 24 January 2006 as part of the second preliminary amendment, are pending.

During a telephone conversation with Mr. William Bak on February 21st, 2008 a provisional election was made to prosecute the invention of Group I, claims 1-2. Affirmation of this election must be made by applicant in replying to this Office action. Claims 3-25 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Election/Restrictions

2. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 1-2, drawn to a sputtering target or thin film formed therefrom.

Group II, claims 3-25, drawn to a method of manufacturing high purity hafnium.

3. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

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Unity exists only when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding claimed technical features. The express "special technical features" is defined as meaning those technical features that define a contribution which each of the inventions, considered as a whole, makes over the prior art." (Rule 13.2). The question of unity of invention has been reconsidered retroactively by the examiner in view of the search performed; a review of US 2003/062261 (Claim 16; example 2; table 4) makes clear that the claimed special technical feature is not novel over the prior art. Furthermore, these references appear to demonstrate that the technical feature (i.e. the high purity hafnium sponge with a zirconium content of 1 to 1000 wtpm and a purity of 4N to 6N excluding gases such as carbon, oxygen, and nitrogen) does not define a contribution which each of the inventions, considered as a whole, makes over the prior art. Thus, lack of unity becomes apparent "a posteriori" after taking the prior art into consideration. Accordingly, the prior art of the record supports restriction of the claimed subject matter in to the groups as mentioned immediately above.

Rejoining practice

4. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims that depend from or otherwise include all the limitations of the allowable product claim will be rejoined in accordance with the provisions of MPEP § 821.04. **Process claims that depend from or otherwise include all the limitations of the patentable product** will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier. Amendments submitted after final rejection are governed by 37 CFR 1.116; amendments submitted after allowance are governed by 37 CFR 1.312.

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In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103, and 112. Until an elected product claim is found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowed product claim will not be rejoined. See "Guidance on Treatment of Product and Process Claims in light of *In re Ochiai*, *In re Brouwer* and 35 U.S.C. § 103(b)," 1184 O.G. 86 (March 26, 1996). Additionally, in order to retain the right to rejoinder in accordance with the above policy, Applicant is advised that the process claims should be amended during prosecution either to maintain dependency on the product claims or to otherwise include the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.**

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. **Claims 1 and 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shindo** (US 2003/0062261 A1).

Shindo is drawn to high purity zirconium or hafnium with minimal impurities (Abstract). Shindo discloses in Example 2, beginning at para 0120 a

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high-purity hafnium sputtering target (claim 4 and Title) with 4N (99.99%) purity level excluding gas components such as carbon, oxygen, and nitrogen (para 0133). Oxygen and carbon are present at less than 500 ppm (claim 6). Table 4 at para 0089 discloses hafnium with a carbon content of 30 ppm, nitrogen less than 10 ppm, and oxygen at 100 ppm. (Table 4 at para 0089). Fe, Cr, and Ni are present at less than 10 ppm (Table 4 at para 0089 and Table 4 at para 0131).

Shindo thus teaches a sputtering target or thin formed therefrom made of a high-purity hafnium material with a 4N purity level excluding gas components of carbon, oxygen, and nitrogen. Examples of hafnium are taught with impurities within the claimed ranges and Shindo further teaches that the zirconium content of the high-purity hafnium material should be 0.5 wt% (5000 wt ppm) or less (claim 1). The disclosed zirconium content thus overlaps the range claimed in claim 1 of the instant application and establishes a *prima facie* case of obviousness with Shindo (See MPEP 2144.05, para I: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists).

Thus it would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made, taking the disclosure of Shindo as a whole, to produce the hafnium target of claims 1 and 2 as one could optimize the prior art ranges taught by Shindo to form a high-purity hafnium material.

Double Patenting

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The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Omum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. **Claims 1 and 2** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3-5 of copending Application No. 11-994,167 in view of Shindo (as applied to claims 1 and 2 above). Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of '167 discloses high purity hafnium of 6N purity (later a sputtering target [Claim 4] or thin film [Claim 5]) with Fe, Cr, and Ni at 0.2 ppm or less and carbon present at 50 ppm or less (Claim 3). '167 does not teach the content of zirconium or oxygen and nitrogen but states that the Zr content and gas components are excluded from the purity measurement, thus suggesting their presence. Shindo teaches that gas component elements such as C, O, N, and H must be reduced as much as

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possible (para 0006-0012 and 0014) and further teaches in Table 4 at para 0089, hafnium with a carbon content of 30 ppm, nitrogen less than 10 ppm, and oxygen at 100 ppm. (Table 4 at para 0089). As explained above the zirconium content overlaps the claimed range at zirconium is taught to be below 0.5 wt% (5000 wt ppm).

It would have been obvious to one of ordinary skill in the art to combine '167 in view of Shindo to form the hafnium material of claims 1 and 2 as both patents are drawn to common problem of producing of high-purity hafnium.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. **Claims 1 and 2** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 2 of copending Application No. 10-595,660 in view of Shindo. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 2 of '660 discloses a high purity hafnium having a purity of 4N, an oxygen content of 40 wt ppm or less, and a zirconium content of 0.1 wt% (1000 wt ppm) or less. Shindo then teaches that gas component elements such as C, O, N, and H must be reduced as much as possible (para 0006-0012 and 0014) and further teaches in Table 4 at para 0089, hafnium with a carbon content of 30 ppm, nitrogen less than 10 ppm, and oxygen at 100 ppm. (Table 4 at para 0089). Shindo further teaches Fe, Cr, and Ni present at less than 10 ppm (Table 4 at para 0089 and Table 4 at para 0131). As explained above the zirconium content

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overlaps the claimed range at zirconium is taught to be below 0.1 wt% (1000 wt ppm) by claims 1 and 2 of '660.

It would have been obvious to one of ordinary skill in the art to combine '660 in view of Shindo to form the hafnium material of claims 1 and 2 as both patents are drawn to common problem of producing of high-purity hafnium.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

-- Claims 1-2 (All elected) are rejected

-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

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